What is claimed is:

1. An electric motor system comprising:

an electric motor;

a temperature sensor mounted inside the motor capable of measuring local temperature and generating a temperature related signal;

a processor that utilizes the temperature signal from the temperature sensor to determine an output mechanical torque generated by the motor.

2. The motor of claim 1, wherein the temperature sensor is mounted on a commutation board.

3. The motor of claim 1, wherein the temperature sensor is an integrated circuit type temperature sensor.

4. The motor of claim 1, further comprising:

an analog-to-digital converter disposed between the temperature sensor and the processor.

5. The motor of claim 4, wherein the temperature sensor is an analog temperature sensor, wherein the analog to digital converter converts a transmitted analog temperature signal into a digital temperature signal.

6. The motor of claim 1, wherein the temperature sensor is a digital temperature sensor.

7. The motor of claim 1, wherein the processor is housed outside of the motor.

8. A centrifuge, comprising:

an electric motor having at least one temperature sensor;

a processor that communicates with the temperature sensor to determine an output mechanical torque generated by the motor;

a motor shaft; and

a specimen holder, connected to the motor shaft.

9. A method for determining the output mechanical torque generated by an electric motor, comprising the steps of:

sensing a local temperature at least one location inside the motor; and

calculating the output mechanical torque generated by the motor based on the sensed temperature.

10. The method of claim 9, wherein the step of sensing the local temperature at a location inside the motor comprises:

measuring the local temperature at a location inside the motor; and

transmitting a temperature signal.

11. The method of claim 10, further comprising the step of:

comparing the calculated temperature of the rotor magnets to a predetermined response temperature; and

adjusting an operation of the motor based on a result of the comparison.

12. The method of claim 9, wherein the step of sensing the local temperature at a location inside the motor is performed using temperature sensors.

13. The method of claim 10, wherein transmitting the temperature signal comprises transmitting an analog signal.

14. The method of claim 10, wherein transmitting the temperature signal comprises transmitting a digital signal.

15. The method of claim 9, further comprising the step of determining a temperature of at least one rotor magnet of the motor.

16. The method of claim 15, wherein the step of determining the temperature of at least one rotor magnet comprises:

determining an offset between the local temperature at the location inside the motor and the temperature of the rotor magnet;

receiving a temperature signal; and

using the determined offset between the local temperature at the location inside the motor and the temperature of the rotor magnets and the received temperature signal to calculate a temperature of the rotor magnets.

17. The method of claim 16, wherein the receiving the temperature signal comprises receiving an analog signal.

18. The method of claim 16, wherein the receiving the temperature signal comprises receiving a digital signal.

19. The method of claim 16, wherein the step of determining the offset between the local temperature at the location inside the motor and the temperature of the rotor magnets comprises:

heating the rotor magnets to at least two different known temperatures;

sensing the corresponding local temperatures at the location inside the motor; and

using an interpolation algorithm to determine the offset between the local temperature at the location inside the motor and the temperature of the rotor magnets.

20. The method of claim 19, wherein the interpolation algorithm is based on a linear relationship.

21. The method of claim 20, further comprising the steps of:

heating the rotor magnets to two known temperatures T_{M1} and T_{M2};

recording corresponding local temperatures at the T_{S1} and T_{S2} location inside the motor; and

determining an actual temperature T_M of the rotor magnets according to

$$T_M = [(T_{M2}-T_{M1})/(T_{S2}-T_{S1})]\cdot T_S+T_{M2}-[(T_{M2}-T_{M1})/(T_{S2}-T_{S1})]\cdot T_{S2},$$

where T_S is a subsequently sensed local temperature at the location.

22. The method of claim 20, wherein the step of calculating the output mechanical torque generated by the motor comprises:

calculating the percent decrease in the output mechanical torque generated by the motor $\Delta\tau$ for a determined temperature of the rotor magnets, T_M according to

$$\Delta\tau = (T_M - T_{M1})\cdot(\Delta B_r),$$

where $\tau_{remaining}$ is the percent of motor torque remaining; and

calculating an output mechanical torque generated by the motor for τ for a calculated percent of motor torque remaining according to

$$\tau = [k_{t\,(20°\,C)}I_s] \cdot \tau_{remaining},$$

where

$k_{t(20°C)}$ is a maximum torque constant of the motor, in/lbs-amp, and

I_S is a known input stator current.

23. The method of claim 22, wherein k_t is based on a temperature other than 20°C.

24. A system for determining the output mechanical torque generated by an electric motor, comprising:

means for sensing a local temperature at at least one location inside the

motor; and

means for calculating the output mechanical torque generated by the motor based on the sensed temperature.

25. The system of claim 24, further comprising:

means for determining the temperature of at least one rotor magnet of the motor.